

09/406,36899RE067/ALBRP138USAMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-7 (Cancelled)

8. (Previously Presented) A multiple axis vibration detection system, comprising:

a light source that directs a beam of light;  
a light receiving system that receives at least a portion of the beam of light;

a first light modulating system that modulates the light beam received by the light receiving system so as to correspond with vibration of a machine;

a second light modulating system that modulates the light beam received by the light receiving system so as to correspond with vibration of the machine, the second light modulating system being in series to the first light modulating system; and

a processing system that analyzes data received from the light receiving system to determine vibration of the machine in a plurality of axes.

9. (Previously Presented) The system of claim 8, at least one of the first light modulating system and the second light modulating system include an obstruction modulator that obstructs the beam of light so that only a portion of the beam of light is received by the light receiving system.

10. (Previously Presented) The system of claim 9, the obstruction modulator obstructs the light beam when the machine is vibrating.

11. (Previously presented) The system of claim 9, the obstruction modulator obstructs the light beam when the machine is not vibrating.

---

09/406,368

99RE067/ALBRP138US

12. (Withdrawn) A system for sensing vibration of a machine, comprising:
  - a light source for directing a beam of light;
  - a light receiving system for receiving at least a portion of the beam of light;
  - a first waveguide for transmitting the beam of light, the first waveguide adapted to vibrate in response to vibration of the machine; and
  - a second waveguide having at least a portion thereof located within a predetermined distance to at least a portion of the first waveguide such that evanescent coupling occurs between the waveguides whereby the second waveguide transmits at least a portion of the beam of light to the receiving system;
  - wherein the intensity of the at least a portion of the beam of light varies as a function of the vibration of the machine.
13. (Withdrawn) The system of claim 12, further including a third waveguide having at least a portion thereof located within a predetermined distance to at least a portion of the first waveguide such that evanescent coupling occurs between the waveguides whereby the third waveguide transmits light to a second light receiving system.
14. (Withdrawn) The system of claim 13, further including a fourth waveguide having at least a portion thereof located within a predetermined distance to at least a portion of the first waveguide such that evanescent coupling occurs between the waveguides whereby the fourth waveguide transmits light to a third light receiving system.
15. (Withdrawn) The system of claim 14, the second, third and fourth waveguides providing for multiple axis vibration detection.
16. (Withdrawn) A system for sensing vibration of a machine, comprising:

---

09/406,36899RE067/ALBRP138US

---

first, second and third light sources for directing beams of light of different frequencies, respectively;

a light receiving system for receiving at least portion of the beams of light;

a first waveguide for transmitting the first beam of light, the first waveguide adapted to vibrate in response to vibration of the machine;

a second waveguide for transmitting the second beam of light, the second waveguide adapted to vibrate in response to vibration of the machine;

a third waveguide for transmitting the third beam of light, the third waveguide adapted to vibrate in response to vibration of the machine; and

a fourth waveguide having at least a portion thereof located within a predetermined distance to at least portions of the first, second and third waveguides, respectively, such that evanescent coupling occurs between the waveguides whereby the fourth waveguide transmits the at least portion of the beams of light to the receiving system;

wherein the intensity of the respective at least portion of the beams of light vary as a function of the vibration of the machine.

17. (Withdrawn) A system for sensing vibration of a machine, comprising:

a light source for directing a beam of light;

a beam splitter for splitting the beam of light into at least a first beam and a second beam;

an optical lateral resonating system for receiving the second beam, the optical lateral resonator reflecting the second beam, the optical lateral resonating system deflecting in response to vibration such that a transmission path of the second beam varies in length as a function of deflection of the optical lateral resonating system;

a receiving system for receiving an interference beam, the interference beam including a combination of the first beam and reflected second beam; and

a processing system for processing and analyzing the interference beam to facilitate determining vibration of the machine.

Claim 18 (Cancelled)

09/406,36899RE067/ALBRP138US

19. (Withdrawn) A system for sensing vibration of a machine, comprising:  
means for directing a beam of light;  
means for receiving at least a portion of the beam of light;  
a first means for transmitting the beam of light, the first means adapted to vibrate  
in response to vibration of the machine; and  
a second means for transmitting light, having at least a portion thereof located  
within a predetermined distance to at least a portion of the first means such that  
evanescent coupling occurs between the first and second means whereby the second  
means transmits the at least a portion of the beam of light to the means for receiving;  
wherein the intensity of the at least a portion of the beam of light varies as a  
function of the vibration of the machine.

20. (Withdrawn) A system for sensing vibration of a machine, comprising:  
means for directing a beam of light;  
means for splitting the beam of light into at least a first beam and a second beam;  
means for receiving the second beam, means for receiving the second beam  
reflecting the second beam, the means for receiving the second beam deflecting in  
response to vibration such that a transmission path of the second beam varies in length as  
a function of deflection of the means for receiving the second beam;  
means for receiving an interference beam, the interference beam including a  
combination of the first beam and reflected second beam; and  
means for processing and analyzing the interference beam to facilitate  
determining vibration of the machine.

Claims 21-32 (Cancelled)

33. (Currently Amended) A system that determines a vibration state for a  
machine, comprising:  
a light receiver that receives light from a source;

---

09/406,36899RE067/ALBRP138US

---

~~an obscuring body~~ a light modulating system comprising an annular structure that based on a particular vibration state of a machine obscures a portion of light transmitted from the source to the light receiver, and

a processor that analyzes an amount of light received by the light receiver to determine the particular vibration state.

34. (Previously Presented) The system of claim 33, the amount of light received by the light receiver increases with increased vibration state of the machine.

35. (Previously Presented) The system of claim 33, the amount of light received by the light receiver decreases with increased vibration state of the machine.

36. Canceled.

37. (Previously Presented) The system of claim 36, the light modulating system includes a housing with a first opening that receives a light beam, a second opening that allows passage of a light beam to the light receiver as a function of a vibration state of the machine.

38. (Previously Presented) The system of claim 36, the light modulating system is attached to the machine.

39. Canceled.

40. (Previously Presented) The system of claim 39, the annular structure permits light to pass in one direction.

41. (Previously Presented) The system of claim 33, the processor determines a vibration state of the machine based upon an area illuminated on a surface of the light receiver.

---

09/406,368

99RE067/ALBRP138US

Claims 42-51 (Cancelled).

52. (New) A system that determines a vibration state for a machine, comprising:  
a light receiver that receives light from a source;  
a light modulating system, having an annular structure, that obscures a portion of light transmitted from the source to the light receiver based on a particular vibration state of the machine, and  
a processor that analyzes an amount of light received by the light receiver to determine the particular vibration state of the machine.

53. (New) The system of claim 52, the annular structure allows light to pass in one direction.

54. (New) The system of claim 52, the light modulating system includes a housing with a first opening that receives a light beam and a second opening that permits the light beam to pass to the light receiver as a function of the vibration state of the machine.

55. (New) The system of claim 52, the light modulating system is attached to the machine.

56. (New) The system of claim 52, the processor determines the vibration state of the machine based upon an area illuminated on the surface of the light receiver.

57. (New) The system of claim 52, the amount of light received by the light receiver increased with increased vibration state of the machine.

58. (New) The system of claim 52, the amount of light received by the light receiver decreases with increased vibration state of the machine.